Exemption No. 8237

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of **AvCraft Aerospace GmbH** Section 25.1309(c) of Title 14, Code of Federal Regulations	**Regulatory Docket No. FAA-2003-16211**

GRANT OF EXEMPTION (Time Limited)

By letter dated September 12, 2003 (EZ-0192/03), Mr. Johannes Mann, Head of Engineering, AvCraft Aerospace GmbH, Postbox 1252, 82231 Wessling, Germany, petitioned for a time-limited exemption from the requirements of § 25.1309(c) of Title 14, Code of Federal Regulations (14 CFR), as they pertain to inconsistent flight phase indications during reduced thrust takeoff operations (RTTO) for Dornier Model 328-300 series airplanes.

Section of the Federal Aviation Regulations (FAR) affected:

Section 25.1309(c) requires that: "…Systems, controls, and associated monitoring and warning means must be designed to minimize crew error which could create additional hazards."

Petitioner's supportive information:

AvCraft explained that certain operators have requested certification of reduced thrust takeoff operations (RTTO). An application for approval of an RTTO design change (Option # 040F036) dated December 6, 2002, was submitted to the FAA. Reduced thrust takeoff operations, when certified, will permit operators to conduct takeoff operations at engine thrust levels below the maximum available takeoff power setting. Such operations will reduce engine deterioration and will therefore have a beneficial economic effect for operators, due to reduced engine maintenance costs and increased engine life.

On the Dornier Model 328-300 series airplanes, engine information, including a flight phase annunciation that provides an indication of the applicable engine thrust rating, is provided by an engine indicating and crew alerting system (EICAS). To accommodate the RTTO design change (Option # 040F036), changes were made to the flight phase annunciation to indicate the thrust ratings associated with reduced thrust operations. AvCraft reported finding that, in certain situations, the flight phase annunciation when an engine has failed is different for a left engine failure than it is for a right engine failure. The difference in annunciations occurs for engine failures below 1,000 feet above ground level and lasts until the airplane is 1,000 feet above ground level.

The flight phase annunciations (i.e., thrust rating indications) should not be different for left vs. right engine failures. The difference results from an error in the implementation of the RTTO design change. The FAA did not accept this discrepancy because providing different flight phase annunciations for the same flight phase has an unacceptable potential for causing crew confusion and distraction during a high workload phase of flight. The affected requirement is 14 CFR 25.1309(c).

AvCraft Aerospace has accepted the FAA position and has scheduled a software change designed to correct the inconsistency in the flight phase annunciation. Until the software change is implemented in the aircraft fleet, a temporary exemption was requested for the time period from July 2003 to December 2004. This time period would be controlled by the Airworthiness Limitation Document (TR ALD-039).

During the time period of the exemption, AvCraft has proposed the following compensating factors:

(a) An update of the description of the flight phase annunciation in the flight crew operating manual (FCOM) so that the existing, non-compliant display logic is presented.

(b) A Flight Operational Information (FOI) bulletin, which will be released to make flightcrews aware of the difference in flight phase annunciation between left and right engine failures.

(c) A risk assessment for an uncommanded inflight shutdown below 1,000 ft. during reduced thrust takeoffs, which is discussed below.

> In order to validate the remaining timeframe between July 2003 and December 2004, in which the flight phase annunciation provides different indications during an uncommanded in-flight shutdown below 1,000 ft. above airport altitude, the following assessment has been provided:

The Dornier Model 328-300 fleet has accumulated 358,235 flight cycles between November 1998 and May 2003. During that timeframe, no engine failures resulting in loss of all thrust from an engine have occurred below 1,000 ft. above ground level.

Based on the monthly rate of 6,513 flight cycles, the Dornier Model 328-300 fleet will accumulate an additional 117,240 flight cycles between July 2003 and December 2004.

The maximum exposure time (one-engine-inoperative takeoff up to 1,000 ft.) is calculated to be 156 seconds. This exposure time is based on the most critical condition in the approved flight envelope and will be conservative for most takeoffs.

The expected number of flight cycles (117,240) multiplied by the exposure time per flight (156 seconds) results in a total maximum exposure time of 5,080.4 hours.

This total exposure time multiplied by the actual engine inflight shutdown rate (provided by the engine manufacturer) of 1.62×10^{-5} and the number of engines per aircraft (2) results in a conservative estimate of 0.1646 fleet-wide in-flight engine shutdowns in the derogation time frame.

The above numbers are deemed sufficiently low to warrant safe operation of the fleet for the envisaged timeframe.

(d) Flight Crew Training. For the interim period, the flightcrew will be trained to be aware that the flight phase is annunciated differently depending on which engine has failed. However, because of other strong cues pertaining to a takeoff, the flightcrew would normally be aware of which flight phase the aircraft is in and would be unlikely to be misled. The effect that the current discrepancy in flight phase information has on the flightcrew's ability to perform a takeoff correctly should therefore be minimal.

Public Interest

The petitioner stated the following:

“The petition is in the public interest on three main points:

“First, by reducing the amount of thrust used during the takeoff phase of flight the PW306B would produce less noise. Although the Dornier 328Jet meets stage III noise requirements, any time the noise level is reduced the local public is served. Although further analysis and testing will be required, the level of noise may be reduced enough to bring the level below the more restrictive < 72 dBA 2200 DCA curfew, thereby potentially allowing the Dornier 328Jet to provide service to the residents of Washington DC more travel options.

"Second, reducing the amount of thrust produced by the PW306B reduces the amount of fuel consumed during the takeoff phase (the highest consumption rate of all phases of flight), thereby reducing the consumption of this non-renewable resource and having as well as extending the range of the Dornier 328Jet potentially increasing the number of city pairs available to consumers. This is accompanied by an equivalent reduction of exhaust emissions. Smoke reduction is even more pronounced.

"Third, with the PW306B power plant, like all mechanical devices, the less stress is exerted on the device the longer it will last. By extending the life of the engine without reducing the time between required maintenance and inspections the amount of time between potential failures increases and further reduces the potential the traveling public could be exposed to an engine failure.

"By receiving the authority to conduct reduced thrust takeoffs in the Dornier 328Jet, both the operators and consumers are served and are hence in the public interest."

Level of Safety Provided

The petitioner stated that they believe the indication inconsistency in this context is benign and that, given the compensating factors and the risk exposure analysis discussed above, the same level of safety can be reached for the limited time period as that provided by the rule from which they seek exemption.

The FAA reviewed the information provided by AvCraft and has concluded that the proposed compensating factors will provide a comparable level of safety to that intended by the regulation.

Notice and Public Procedure Provided

The petitioner has requested that a decision on their petition for exemption not be delayed by publication in the Federal Register and a public comment period. In accordance with 14 CFR 11.87, the FAA finds that action on this petition need not be delayed by Federal Register publication and comment procedures because issuance of the exemption would not set a precedent and a delay would adversely affect AvCraft and the engine manufacturer.

FAA Analysis

It was discovered during the RTTO certification program that, under certain conditions, the EICAS flight phase indications provided to the flightcrew after an engine failure differ, depending on which engine has failed (left or right). (The flight phase indications show the currently applicable engine thrust rating, for example maximum takeoff, maximum continuous, maximum climb, etc.) Specifically, if an engine failure occurs below 1,000 feet above ground level during a reduced thrust takeoff, the EICAS will indicate "S-CL" (for single engine climb) if the left engine fails, or "CONT" (for maximum continuous) if the right engine fails. The FAA

believes that such an inconsistency has the potential for contributing to crew confusion and distraction during a high workload phase of flight, and is therefore not compliant with 25.1309(c). The petitioner is requesting relief from this regulation as it pertains to these inconsistent flight phase indications.

The FAA has determined that the petitioner's supportive information provides sufficient justification for granting an exemption. This determination is based mainly on the analysis of safety effects and compensating factors proposed for the exemption time period. The grant of this exemption benefits the traveling public while maintaining safety and providing flexibility to the manufacturer.

The Grant of Exemption

In consideration of the foregoing, I find that a grant of exemption is in the public interest and will not adversely affect the level of safety provided by the regulations. Therefore, pursuant to the authority contained in 49 U.S.C. 40113 and 44701, delegated to me by the Administrator, the petition of AvCraft Aerospace GmbH, for an exemption from the requirements of § 25.1309(c) of Title 14, Code of Federal Regulations (14 CFR), to permit AvCraft, for the Model Dornier 328-300 series airplanes, to be temporarily relieved of the requirement that "…Systems, controls, and associated monitoring and warning means must be designed to minimize crew error which could create additional hazards," as it pertains to inconsistent flight phase indications during reduced thrust takeoff operations (RTTO), is hereby granted for the limited time period from the date of issuance of this exemption until, but not including, January 1, 2005.

Issued in Renton, Washington, on February 4, 2004.

/s/ Kevin M. Mullin

Kevin M. Mullin
Acting Manager
Transport Airplane Directorate
Aircraft Certification Service